

A new species of the genus *Idiops* and notes on *Idiops bombayensis* Siliwal et al. 2005 (Araneae: Idiopidae) from Northern Western Ghats of Maharashtra, India

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Abstract. A new species of trapdoor spider, *Idiops rubrolimbatus* sp. nov., is described from the northern part of the Western Ghats of Maharashtra. *Idiops bombayensis* Siliwal et al. 2005 was originally described based on only a female specimen. Here, a description of the male is provided for the first time, along with a female description based on fresh collections from Mumbai and Matheran, Maharashtra state, India. Natural history information is provided for both species.

Keywords: Trapdoor spider, male, natural history, burrow

In India, trapdoor spiders are represented by four families, and the most widespread and species-rich family is the Idiopidae (Siliwal et al. 2005, Siliwal et al. 2009). Worldwide, this family is represented by 22 genera and 303 species in three subfamilies (Platnick 2011) and in India by three genera, namely *Heligmomerus* Simon 1892, *Idiops* Perty 1833 and *Scalidognathus* Karsch 1891, totaling 12 species (Siliwal et al. 2007; Sanap & Mirza 2011). The genus *Idiops* Perty 1833 is the most widespread trapdoor genus, being represented by seven species in India (Siliwal et al. 2005; Siliwal et al. 2010). This genus was originally placed in the Ctenizidae; but Raven (1985) transferred it to the Idiopidae, differentiating males of the Idiopidae from those of the ctenizids in having a distal haematodocha extending almost down to the embolus, transforming the distal sclerite into an open scoop, and also by the bilobed palpal tarsus with one blunt and one acutely pointed lobe. Many species of *Acanthodon* Guérin 1838 were transferred to *Idiops* (see Platnick 2011). Recently, Siliwal et al. (2010) transferred two species, *I. biharicus* and *I. barkudensis*, from *Idiops* to *Heligmomerus*.

Idiops bombayensis Siliwal et al. 2005 was described by Pocock (1899) from the 'Bombay region' as *Acanthodon opifex* and later was transferred to *Idiops* by Roewer (1942). This transfer created a homonymy with *Idiops opifex* Simon 1899; thus to stabilize the nomenclatural conflict, Siliwal et al. (2005) provided a replacement name for *I. bombayensis*. This species was known from the Bombay (= Mumbai) region without any precise locality, and the original description was based on few prominent morphological characters, lacking information like leg morphometry, spermathecae and natural history. While conducting surveys in and around Mumbai, we collected specimens of two species of the genus *Idiops*. We identified one of them as *I. bombayensis*, and the other one represents a hitherto undescribed species. In the present paper, we provide detailed taxonomic descriptions of both sexes of *I. bombayensis* based on the fresh collection along with the description of the new species.

METHODS

Spiders were collected during biodiversity surveys conducted in 2010 in Mumbai and Matheran, Maharashtra. The

specimens are deposited at the Wildlife Information Liaison Development Society, Coimbatore, Tamil Nadu. Measurements of body parts except for the eyes were taken with a Mitutoyo™ Dial Caliper. Eye measurements were done with a calibrated ocular micrometer. All measurements are in mm. Spermathecae were dissected and cleared in clove oil using teasing needles. Specimens were examined using a Labomed™ CSM2 stereo-binocular microscope. Descriptive style follows Siliwal et al. (2009). All illustrations were prepared using a camera lucida attached to a CETII™ stereomicroscope by MS. The description was compared with available literature by Pocock (1900) and Tikader (1977).

Abbreviations: ALE = anterior lateral eye, AMC = Aarey Milk Colony, AME = anterior median eye, MOQ = median ocular quadrate, PLE = posterior lateral eye, PME = posterior median eye, PLS = posterior later spinnerets, PMS = posterior median spinnerets, WILD = Wildlife Information Liaison Development Society, RS = Rajesh Sanap, ZM = Zeeshan Mirza. Abbreviations used for hair and spine counts are d = dorsal, fe = femur, mt = metatarsus, p = prolateral, pa = patella, r = retrolateral, ta = tarsus, ti = tibia and v = ventral.

TAXONOMY

Idiops Perty 1833

Idiops Perty 1833:197; Gravely 1915:261; Gravely 1935:69; Raven 1985:138; Dippenaar-Schoeman 2002: 68.
Acanthodon Guérin 1838:10; Simon 1892:91; Pocock 1900:161; Tikader 1977:306.

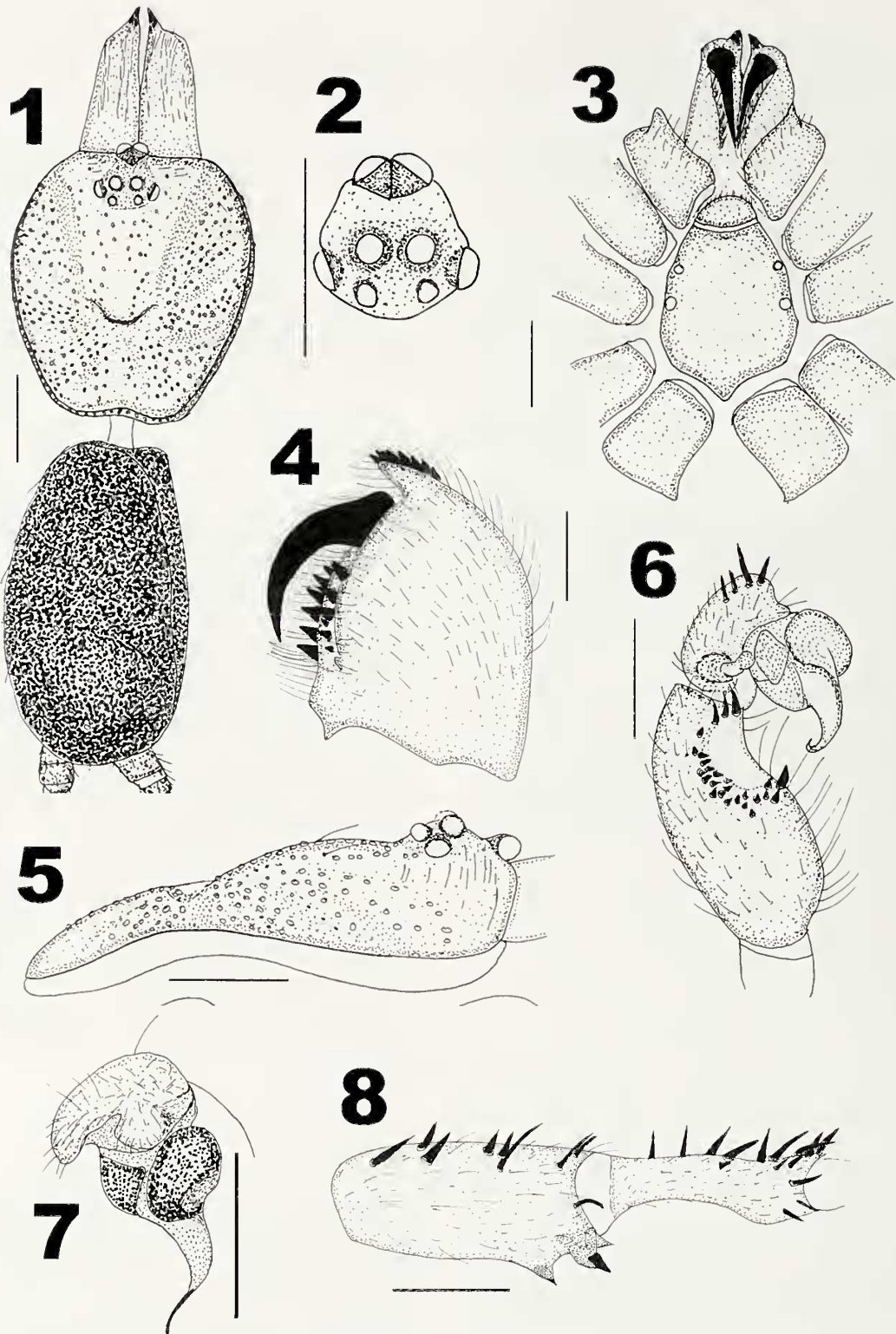
Type species.—*Idiops fuscus* Perty 1833.

Diagnosis.—ALE set far in advance of others, making eye group much longer than wide; chelicerae medially normal; dorsal abdomen soft, lacking chitinized shield; two rows of cheliceral teeth and posterior sternal sigilla absent (Raven 1985).

Idiops bombayensis Siliwal, Molur & Biswas 2005 (Figs. 1–15)

Acanthodon opifex Pocock 1899:750, 1900:162.

Idiops bombayensis Siliwal, Molur & Biswas 2005:2004.

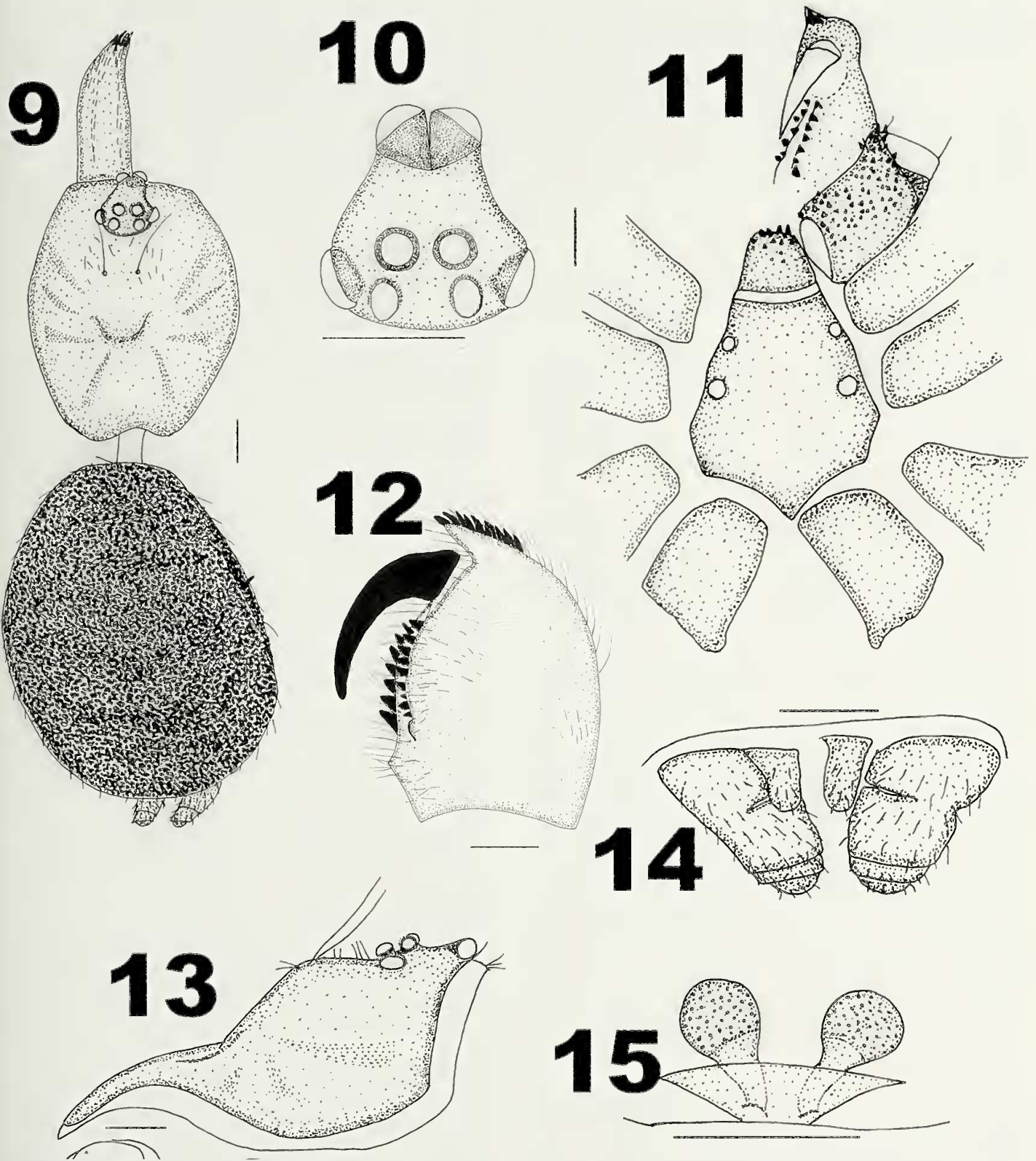


Figures 1–8.—*Idiops bombayensis* male from Aarey Milk Colony. 1. Cephalothorax and abdomen, dorsal view; 2. Eyes; 3. Sternum, labium, maxillae and chelicerae; 4. Chelicerae prolateral view; 5. Lateral view of carapace; 6. Palp tarsi and tibia, retrolateral view; 7. Palp bulb, ventral view; 8. Metatarsi and tibia of leg I. Scale bar 1mm.

Type material.—Holotype, female, Bombay, coll. H.M. Phipson, Museum of Natural History, London (not examined).

Material examined.—INDIA: *Maharashtra*: Raighad district, Matheran, 19°00'N, 73°17'E, 19 February 2010, coll. Rajesh Sanap, Ashish Jadhav & Zeeshan Mirza, 1 female,

WILD-10-ARA-401; Mumbai, Aarey Milk Colony, 19°07'31"N, 72°52'76"E, 26 February 2010, coll. Rajesh Sanap & Zeeshan Mirza, 1 female, WILD-10-ARA-402; 1 male, 27 June 2010, coll. Rajesh Sanap & Zeeshan Mirza, WILD-10-ARA-545.



Figures 9–15.—*Idiops bombayensis* female from Aarey Milk Colony. 9. Cephalothorax and abdomen, dorsal view; 10. Eyes; 11. Sternum, labium, maxillae and chelicerae; 12. Chelicerae prolateral view; 13. Carapace lateral view; 14. Spinnerets; 15. Spermathecae. Scale bar 1 mm.

Table 1.—Morphometry of legs and palp of the female (WILD-07-ARA-401), (WILD-07-ARA-402) and male (WILD-07-ARA-545) of *Idiops bombayensis*. All measurements in mm (± 0.02 mm).

	Leg I			Leg II			Leg III			Leg IV			Palp		
	#401	#402	#545	#401	#402	#545	#401	#402	#545	#401	#402	#545	#401	#402	#545
Femur	4.42	3.26	2.94	3.68	2.74	2.58	3.56	2.68	1.96	5.22	3.86	2.86	3.98	2.60	1.72
Patella	2.42	1.68	1.12	2.36	1.90	0.98	2.56	1.56	0.84	3.30	2.02	1.28	2.18	1.48	0.68
Tibia	2.52	1.94	1.92	2.30	1.36	1.74	1.82	1.54	1.14	3.32	2.15	2.04	2.44	2.04	1.58
Metatarsus	2.18	1.28	1.94	2.18	1.52	1.50	2.18	1.20	1.28	2.94	1.48	1.92	—	—	—
Tarsus	1.08	0.94	0.98	1.42	1.28	0.76	1.52	0.84	0.76	1.68	1.15	1.06	2.70	1.66	0.50
Total	12.64	9.1	8.9	11.94	8.8	7.56	11.64	7.82	5.98	16.64	10.66	9.16	11.3	7.78	4.48
Midwidth															
Femur	1.42	1.14	0.60	1.38	1.40	0.62	1.68	1.16	0.78	1.96	1.30	0.72	1.42	1.02	0.32
Tibia	1.06	0.84	0.84	1.04	0.82	0.44	1.30	0.88	0.44	1.40	0.78	0.44	1.04	0.82	0.76

Diagnosis.—*Idiops bombayensis* males differ from those of *I. fossor*, *I. designates*, *I. rubrolimbatus* and *I. garoensis* in possessing a prominent tubercle below the tibial apophysis. Females differ from those of *I. fortis* and *I. constructor* in lacking a band of spinules below coxa IV and in having the tibia of leg III longer than wide, and from those of *I. madrasensis* in spermathecae shape.

Description.—Male from Aarey Milk Colony (WILD-10-ARA-545). Total length 8.06; carapace 3.54 long, 2.74 wide; chelicerae 3.18 long. Abdomen 4.52 long, 3.12 wide. Spinnerets: PMS, 0.18 long, 0.10 wide, 0.30 apart; PLS, 0.76 total length (0.38 basal, 0.24 middle, 0.14 distal; midwidths 0.38, 0.30, 0.18 respectively). Morphometry of legs and palp are given in Table 1.

Color in life (Fig. 36): overall blackish; carapace deep glossy black, abdomen reddish brown. Anterior legs blackish brown, except for the tarsi and distal portion of the metatarsi; posterior legs paler and more brownish.

Carapace (Figs. 1, 5): reddish-brown, granules/tubercles, dense, throughout carapace; two long and several short bristles on caput; few lines of depression along interstitial ridges. Caput with distinct mound between fovea and eyes, rough. Fovea deep, procurved, U-shaped.

Eyes (Fig. 2): eight, ALE situated far in advance of rest. Posterior row slightly procurved, ocular group 1.60 long, 0.56 wide; diameter AME 0.14, PME 0.10, ALE 0.14, PLE 0.12; distance between ALE-AME 0.22, AME-AME 0.08, PLE-PME 0.06, PME-PME 0.20; MOQ not square, 0.38 long, 0.34 front width, 0.36 back width.

Maxillae (Fig. 3): 0.98 long in front and 1.10 long in back, 0.68 wide; cuspules absent, anterior lobe distinct.

Labium (Fig. 3): 0.42 long, 1.48 wide; labiosternal groove shallow, cuspules absent.

Chelicerae (Fig. 4): 5 promarginal teeth and 6 retromarginal teeth; rastellum conspicuous on distinct process; 10 large and small spines on dorso-prolateral; ventral face and up.

Sternum (Fig. 3): yellowish-green, with elevated anterior and lateral sides, sloping posteriorly, 1.60 long, 1.54 wide, covered with long black hair, row of these radiating out of borders, posterior angle acute.

Sigilla (Fig. 3): anterior 0.8 in diameter and 0.84 apart, situated 0.02 from margin; middle ca. 0.10 in diameter and 1.20 apart and 0.06 away from margin; posterior sigilla absent.

Legs: leg I clearly thicker than rest, greenish-brown above and light yellowish-green below. Metatarsi of all legs longer than tarsi. Two conspicuous hairless bands running for length of femora, patellae and tibiae. Tibia I, with apophysis with a triangular stout spine below, with a tubercle with a pointed spine; mt I deeply incrassate in basal 3/4, with indistinct prolateral process (Fig. 8). Scopulae, tibia I-III present, full length, ti IV absent; claw tufts absent. Leg formula 1423.

Spines: curved, thick thorn-like or stout spike-like spines. ti I, p = 2, r = 2; mt I, r = 8; ta I, r = 5; ti II, p = 2, r = 3; mt II, p = 2, r = 5; ta II, p = 1, r = 1; pa III, r = 2; ti III, r = 2, v = 2; mt III, r = 5, v = 2; fe III, r = 2; pa IV, p = 9; ti IV, v = 4; mt IV, p = 2, v = 4; ta IV, p = 3, v = 2; palp, ti, r = 25; ta, d = 6.

Coxae: yellowish-green; coxa IV wider than rest; coxa I longer than rest.

Claws: all legs with three claws, paired claws I-III with 5 small teeth and IV with 3 teeth.

Abdomen (Fig. 1): glossy reddish-brown with silvery golden spike-like hairs in life; in alcohol, grayish-brown with yellowish dots dorsally; covered with short and long black hairs; ventrally yellowish-green covered with black hairs.

Spinnerets: PMS digitiform; PLS, apical segment dome-shape. Overall covered with brown hair and with numerous spigots on all segments.

Palp (Fig. 6, 7): tibia inflated with ventral concavity, crescent band of 26 spines on retrolateral side of concavity. Tarsus bilobed, one lobe blunt and another digitiform, dorso-distally four spines. Palp simple, embolus broad at base tapering abruptly at distal end; distal end twisted and embolus tip facing towards the retrolateral aspect and forward; terminates in scoop-like structure.

Description.—Female from Aarey Milk Colony (WILD-10-ARA-402). Total length 15.88; carapace 5.88 long, 7.02 wide; chelicerae 3.68 long. Abdomen 10.0 long, 7.02 wide. Spinnerets: PMS, 0.72 long, 0.20 wide, 0.08 apart; PLS, 2.06 total length (0.68 basal, 0.92 middle, 0.46 distal; midwidths 0.94, 0.80, 0.68 respectively). Morphometry of legs and palp are given in Table 1.

Color in life (Fig. 37): glossy blackish brown all over. Chelicerae and dorsal aspect of legs black. Abdomen dark brown.

Carapace (Figs. 9, 13): yellowish-brown, glabrous except for two long and short spine-like hairs on caput, few lines of

depression along interstitial ridges. Caput with distinct mound between fovea and eyes. Fovea deep, procurved, U-shaped.

Eyes (Fig. 10): eight, ALE situated far in advance of rest. Posterior row slightly procurved, ocular group 0.88 long, 0.86 wide; diameter AME 0.20, PME 0.08, ALE 0.14, PLE 0.16; distance between ALE–AME 0.30, AME–AME 0.12, PLE–PME 0.08, PME–PME 0.22, ALE–ALE 0.08, ALE–PLE 0.58; MOQ not square, 0.40 long, 0.46 front width, 0.58 back width.

Maxillae (Fig. 11): 1.98 long in front and 1.23 long in back, 1.26 wide; ca. 75 cuspules on anterior edge larger than rest. Anterior lobe distinct.

Labium (Fig. 11): 0.96 long, 1.08 wide, labiosternal groove shallow anteriorly, cuspules arranged in two, 5 large in first row and 4 small in a row behind the large cuspules.

Chelicerae (Fig. 12): 6 promarginal and 6 retromarginal teeth, basomesal teeth absent; rastellum conspicuous on distinct process, 20 spines dorso-prolateral, vertical face and up.

Sternum (Fig. 11): yellowish-brown, with elevated anterior and lateral sides, sloping posteriorly, 3.26 long, 2.62 wide, covered with long black hair, row of these radiating out of borders, posterior angle acute.

Sigilla (Fig. 11): anterior 0.18 in diameter and 2.10 apart, situated on margin; middle about 0.22 in diameter and 2.40 apart; posterior sigilla absent.

Legs: leg III clearly thicker than rest, brownish-green above and yellowish-green below, except tarsi of palp and metatarsi and tarsi of all legs darker above. Metatarsi of all legs longer than tarsi. Two conspicuous hairless bands running for length of femora, patellae and tibiae. Scopulae and claw tufts absent on tarsi of all legs and palp. Leg formula 4123.

Spines: curved, thick thorn-like and normal spines. ti I, p = 14, r = 14; mt I, p = 18, r = 20; ta I, p = 10, r = 9; ti II, p = 8, r = 4; mt II, p = 19, r = 7; ta II, p = 7, r = 4; pa III, p = 1, r = 2; ti III, p = 9, r = 3; mt III, p = 7, r = 5; ta III, p = 6, v = 6; pa IV, p = 32; mt IV, p = 8, v = 1; ta IV, p = 10, v = 2; palp, fe, p = 1, pa, p = 1; ti, p = 18, r = 15; ta, p = 21, r = 24.

Coxae: coxae of legs yellowish-brown; coxae IV wider than rest; coxae I longer than rest.

Claws: all legs with three claws, paired claw I with single tooth; II–IV with two teeth. Palp with single claw bearing single unequal tooth. Claws of leg IV longer than rest, claws of leg I & II equal, claw of leg III smallest. Claw tufts absent.

Abdomen (Fig. 9): glossy blackish-brown with silvery-golden spike-like hairs in life, grayish-brown dorsally; covered with short and long setae; ventrally yellowish-grey covered with brown hairs.

Spinnerets (Fig. 14): PMS digitiform; PLS, covered with brown hair, apical segment dome-shape. Covered with brown hair and numerous spigots.

Spermathecae (Fig. 15): globular apical lobe on stalk, resembling button mushroom.

Variation.—morphometry of specimen from Matheran (WILD-10-ARA-401). Total length 16.84; carapace 6.74 long, 5.72 wide; chelicerae 4.02 long, 8 retromarginal and 9 promarginal teeth. Sternum 3.98 long, 3.44 wide. Labium 1.12 long, 1.68 wide, 4 large cuspules in 2 rows (2 + 2). Maxillae 1.12 long back, 1.98 long front, 1.26 wide, cuspules 60–80 of varying size, larger near the promarginal region. Abdomen 10.10 long and 7.34 wide. Spinnerets: PMS, 0.60

long, 0.40 wide, 0.28 apart; PLS, 1.74 total length (0.66 basal, 0.96 middle, 0.12 distal; midwidths 0.88, 0.78, 0.68 respectively). Morphometry of leg and palp given in Table 1.

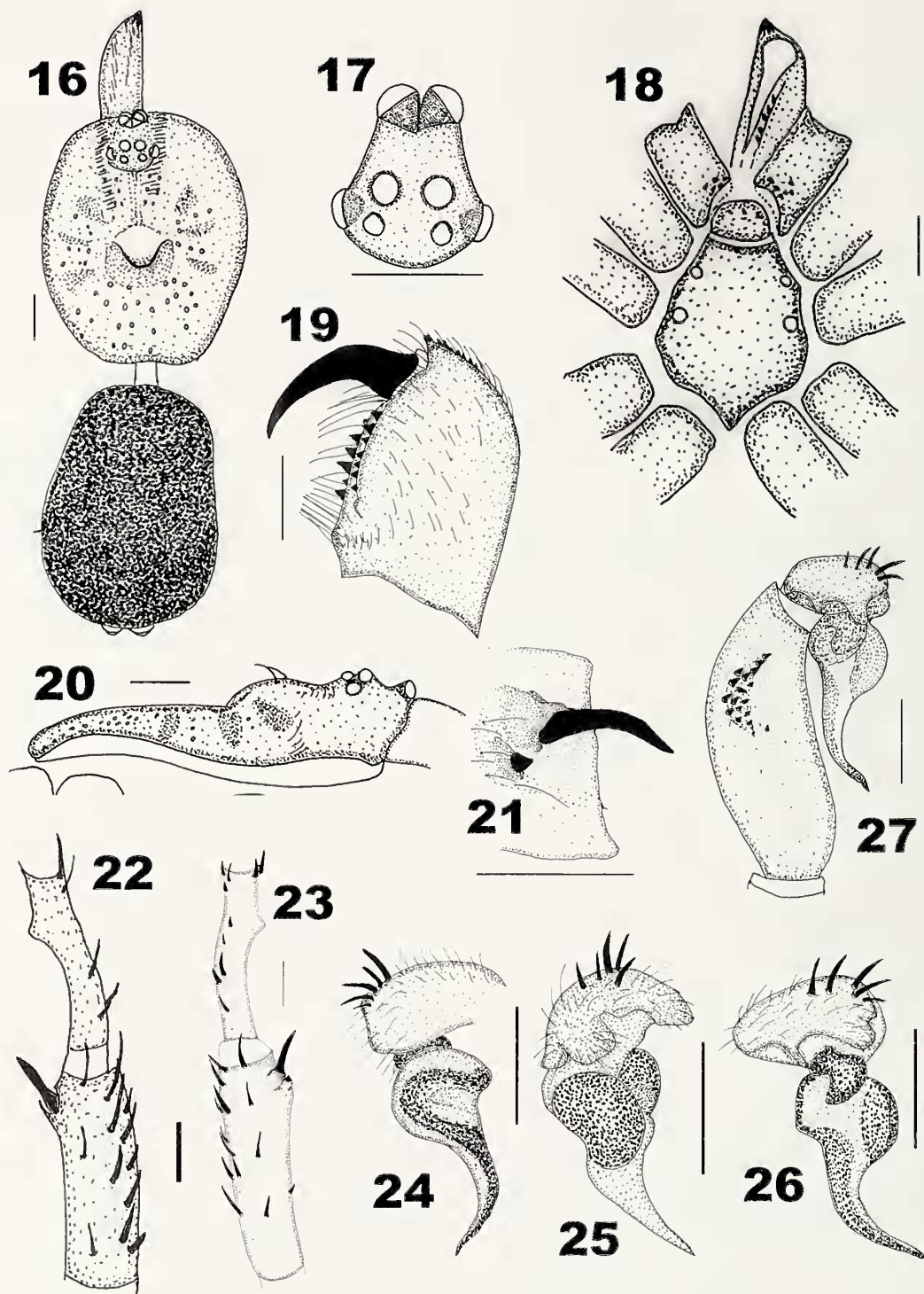
Eyes: eight, ALE situated far in advance of rest. Posterior row slightly procurved, ocular group 1.34 long, 1.28 wide; diameter AME 0.22, PME 0.10, ALE 0.24, PLE 0.18; distance between ALE–AME 0.74, AME–AME 0.18, PLE–PME 0.12, PME–PME 0.50, ALE–ALE 0.16, ALE–PLE 0.86; MOQ not square, 0.54 long, 0.56 front width, 0.62 back width.

Natural history and distribution.—Spiders were collected from Aarey Milk Colony, Mumbai and Matheran, Raighad district in Maharashtra state (Fig. 35). Burrows of this species have also been observed in the Sanjay Gandhi National Park in Mumbai. Habitat in Mumbai is of typical mixed moist deciduous forest and that in Matheran of semi-evergreen type. The flora in Mumbai region is composed of *Tectona grandis*, *Butea monosperma*, *Cassia* sp., *Bombax* sp., *Acacia* spp., *Ziziphus* spp. and several exotic species. Most of the burrows (especially of juveniles) were found on roadside mud bunds and a few under shrubs or at the base of trees (large individuals). The density of these spiders was about 8–20 per m². The burrow structure was a simple trapdoor, a single or sometimes double entrance leading to a tubular burrow, which was wider at base than at its entrance. The burrow and the inner side of the door were lined with a thick layer of white silk. The 'D' shaped doors were made up of thick layer (5 mm) of mud, moss or lichen, which were supported by a thick layer of silk, making them well camouflaged with their surrounding. The diameter of the burrow of the specimen from Matheran at the door was about 13 mm and the chamber 15 mm inside. All the burrows were observed to be perpendicular to the angle of the slope of the roadside bunds. The burrows ranged from 60–200 mm in total length. Several burrows were found empty with an empty egg sac (probably juveniles had hatched out and dispersed) in the first week of May, and two burrows had females with intact egg sacs. The eggs sacs were dissected to estimate brood size. The first egg sac contained 32 juveniles collected from the burrow of a small female and the other with 155 juveniles excavated from the burrow of a large female. This species is presently known with certainty from only three localities: Matheran (Raighad district), Mumbai and Bhimashankar (Pune district). After heavy rains in June in Mumbai, several female specimens were found in leaf litter. Soil erosion and removal of soil for brick making is the major threat to this species at the collection localities.

***Idiops rubrolimbatus* new species**
(Figs. 16–34)

Type specimens.—INDIA: Maharashtra: holotype male, Aarey Milk Colony near Royal Palms, Mumbai, 19°07'31.94"N, 72°52'76.87"E, 12 May 2010, Rajesh Sanap and Zeeshan Mirza (WILD-10-ARA-1108); one female paratype, same data as holotype (WILD-10-ARA-1109).

Diagnosis.—*Idiops rubrolimbatus* male differs from those of *I. constructor* and *I. bombayensis* in lacking a large tubercle below the tibial spur, differs from *I. designatus* in having a slender and distinctly concave metatarsus of leg I, from *I. gaoensis* and *I. bombayensis* in possessing cuspules on the maxillae and labium. Differs from *I. fossor* in having moderate



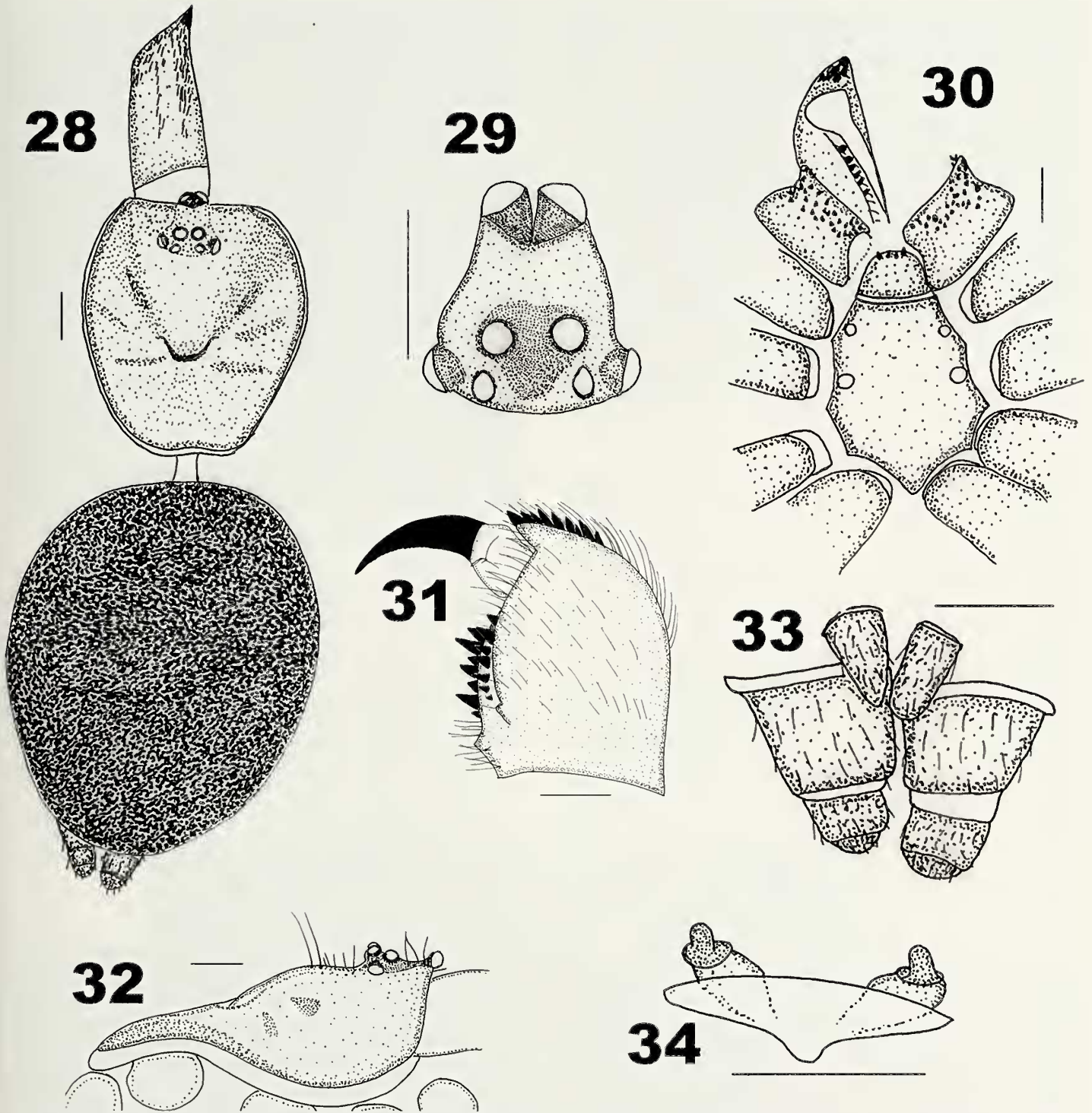
Figures 16-27.—*Idiops rubrolimbatus* sp. nov. male from Aarey Milk Colony. 16. Cephalothorax and abdomen, dorsal view; 17. Eyes; 18. Sternum, labium, maxillae and chelicerae; 19. Chelicerae prolateral view; 20. Carapace lateral view; 21. Tibial spur; 22. metatarsus and tibia of leg I; 23. Metatarsus and tibia of leg I; 24. Palp bulb, prolateral view; 25. Palp bulb, frontal view; 26. Palp bulb, retrolateral view; 27. Palp tarsi and tibia, retrolateral view. Scale bar 1 mm.

concavity on metatarsi that exceeds half the length of the segment (strong concavity in basal half of metatarsi in *I. fossor*), tip embolus faces outward and toward the retrolateral face (tip of embolus faces forward and toward the retrolateral face in *I. fossor*).

Females of *I. rubrolimbatus* differ from those of *I. constructor* and *I. fortis* in lacking a band of spinules under

coxae IV. Spermathecae emerging from distal ends of each leaf-like sclerotized structure fused at base supporting an inverted bell on a stalk distinguishing it from *I. bombayensis* and *I. madarasensis*.

Description.—Holotype male from Aarey Milk Colony (WILD-10-ARA-1108). Total length 10.88; carapace 5.38 long, 4.84 wide; chelicerae 2.84 long. Abdomen 5.50 long,



Figures 28–34.—*Idiops rubrolimbatus* sp. nov. female from Aarey Milk Colony. 28. Cephalothorax and abdomen, dorsal view; 29. Eyes; 30. Sternum, labium, maxillae and chelicerae; 31. Chelicerae prolateral view; 32. Carapace lateral view; 33. Spinnerets; 34. Spermathecae. Scale bar 1 mm.

4.06 wide. Spinnerets: PMS, 0.38 long, 0.20 wide, 0.24 apart; PLS, 0.79 total length (0.44 basal, 0.18 middle, 0.16 distal; midwidths 0.58, 0.44, 0.30, respectively). Morphometry of legs and palp given in Table 2.

Color in life (Fig. 38): carapace brownish with a red tinge on the periphery, abdomen blackish. Legs reddish brown overall.

Carapace (Figs. 16, 20): reddish-brown, warty along the interstitial ridges; two long and several short spine-like hairs on caput, few lines of depression along interstitial ridges. Caput with distinct mound between fovea and eyes. Fovea deep, procurved, U-shaped.

Eyes (Fig. 17): ALE situated far in advance of rest. Posterior row slightly procurved, ocular group 1.18 long,

Table 2.—Morphometry of legs and palp of holotype male (WILD-07-ARA-1108) and female paratype (WILD-07-ARA-1109) of *I. rubrolimbatus* sp. nov. All measurements in mm. (± 0.02 mm).

	Leg I		Leg II		Leg III		Leg IV		Palp	
	#1108	#1109	#1108	#1109	#1108	#1109	#1108	#1109	#1108	#1109
Femur	5.99	3.66	5.04	3.5	3.57	3.42	5.2	4.55	3.78	3.58
Patella	2.91	2.46	2.37	2.33	2.33	2.53	2.93	3.2	2.11	2.49
Tibia	3.99	2.28	3.38	1.99	2.13	1.84	4.15	3.08	3.13	2.57
Metatarsus	4.56	1.99	3.99	1.64	3.5	2.08	4.71	3.14	0	0
Tarsus	1.65	1.01	2.15	1.06	2.08	1.41	2.22	1.67	3.01	2.73
Total	19.09	11.4	16.93	10.52	13.61	11.28	19.19	15.64	12.03	11.36
Midwidth										
Femur	1.5	0.98	1.36	1.1	1.42	1.62	1.46	1.3	0.8	0.76
Tibia	1.36	1.18	1.04	0.96	1.14	1.19	1.06	1.2	1.18	0.98

1.18 wide; diameter AME 0.20, PME 0.18, ALE 0.20, PLE 0.24; distance between ALE-AME 0.48, AME-AME 0.22, PLE-PME 0.08, PME-PME 0.34, ALE-ALE 0.22; MOQ not square, 0.46 long, 0.62 front width, 0.80 back width.

Maxillae (Fig. 18): 1.18 long in front and 1.70 long in back, 0.96 wide; 11 cuspules toward anterior inner edge, anterior lobe distinct.

Labium (Fig. 18): 0.58 long, 0.86 wide, labiosternal groove shallow, 3 large and 1 small cuspules on anterior edge.

Chelicerae (Fig. 19): 7 promarginal teeth and 6 retro-marginal teeth; rastellum conspicuous on a distinct process, 15 spines on dorso-prolateral and vertical face and up.

Sternum (Fig. 18): yellowish brown, with elevated anterior and lateral sides, sloping posteriorly, 3.32 long, 2.62 wide, covered with long black hair, a row of these radiating out of the borders, posterior angle acute and not separating coxae IV.

Sigilla (Fig. 18): anterior 0.14 in diameter and 1.32 apart, situated 0.06 from margin; middle ca. 0.16 in diameter, 1.66 apart and 0.12 away from margin; posterior sigilla absent.

Legs: all legs reddish brown in life and orange in alcohol. Tibiae and femorae IV wider than rest. Metatarsi of all legs longer than tarsi. Coxae yellowish-brown. Two conspicuous hairless bands running for length of femora, patellae and tibiae. Leg formula 4123. Ti I, prolateral apophysis consists of a long spine with a small spine below it; mt I $3/4^{\text{th}}$ incrassate, with a distinct short prolateral process (Figure 21-23). Scopulae present on ta I-III, absent on ta IV; claw tufts absent.

Spines: curved thick thorn-like or stout spike-like spines. pa I, v = 4; ti I, p = 5, r = 3, v = 10; mt I, p = 1, r = 6, v = 1; ta I, p = 5, r = 5; pa II, p = 1, d = 1; ti II, p = 4, r = 4, v = 7; mt II, p = 4, r = 8, v = 2; ta II, p = 1, r = 7; pa III, p = 8, r = 3; ti III, p = 8, r = 11, v = 5; mt III, p = 7, r = 10, v = 3;



Figure 35.—Map showing relative position of Aarey Milk Colony (square) and Matheran (circle) in the Western Ghats of India.



Figure 36.—*Idiops bombayensis* male from Aarey Milk Colony.

fe III, d = 1; ta III, p = 1; fe IV, d = 4; pa IV, p = 15, d = 3; ti IV, p = 1, v = 5; mt IV, p = 5, v = 2, v = 7; ta IV, p = 4, v = 4, v = 6; palp, fe, d = 5; ti, r = 17; ta, d = 4.

Coxae (Fig. 18): IV wider than rest; I longer than rest.

Claws: all legs with three claws, paired claws of leg I & II with five teeth; claw of leg III with 2 and of leg IV with 4 teeth. Claw of leg IV longer than rest, claw of leg I & II equal, claw of leg III smallest. Claw tufts absent.

Abdomen (Fig. 16): reddish brown above; covered with short and long black hairs. Ventrally yellowish covered with black hairs. The preserved specimen wrinkled. Glossy reddish brown, with silvery golden spike-like setae in life.



Figure 37.—*Idiops bombayensis* female from Matheran.



Figure 38.—*Idiops rubroliubatus* male holotype.

Spinnerets: PMS digitiform; PLS, apical segment dome-shape (Fig. 5). Covered with brown hair and numerous spigots.

Palp (Figs. 24–27): tibia cylindrical (not inflated as seen in *I. bombayensis* and *I. constructor*) and lacks antero-ventral concavity; retrolaterally a small band of 16 spines on slightly elevated area, and one spine slightly away from the band. Tarsus, dorsally with three spines. Palp simple, embolus broad at base, gradually tapering and terminating in pointed scoop with slight twist; tip of embolus directed toward retrolateral face and projecting downwards.

Description.—Female paratype from Aarey Milk Colony (WILD-10-ARA-1109). Total length 14.16; carapace 6.10 long, 5.10 wide; chelicerae 3.12 long. Abdomen 8.06 long, 6.40 wide. Spinnerets: PMS, 0.48 long, 0.32 wide, 0.16 apart; PLS, 1.48 total length (0.24 basal, 0.74 middle, 0.50 distal; midwidths 0.80, 0.70, 0.54, respectively). Morphometry of legs and palp are given in Table 2.

Color in life (Fig. 39): Shade of brown overall, chelicerae deep black. Legs with reddish tinge.



Figure 39.—*Idiops rubroliubatus* female from Sanjay Gandhi National Park (not collected).



Figure 40.—Trapdoor burrows of *Idiops rubrolimbatus* from Sanjay Gandhi National Park.

Carapace (Figs. 28, 32): yellowish-brown, glabrous except for two long and short spine-like hairs on caput, few lines of depression along interstitial ridges. Caput with distinct mound between fovea and eyes. Fovea deep, procurved, U-shaped.

Eyes (Fig. 29): eight, ALE situated far in advance of rest. Posterior row slightly procurved, ocular group 1.30 long, 1.04 wide; diameter AME 0.18, PME 0.14, ALE 0.22, PLE 0.22; distance between ALE-AME 0.48, AME-AME 0.20, PLE-PME 0.10, PME-PME 0.38; MOQ not square, 0.38 long, 0.44 front width, 0.48 back width.

Maxillae (Fig. 30): 1.58 long in front and 2.30 long in back, 1.06 wide; with from ca. 50 cuspules. Cuspules towards anterior edge larger. Anterior lobe distinct.

Labium (Fig. 30): 0.98 long, 1.06 wide, labiosternal groove shallow; 4 cuspules anteriorly in single row.

Chelicerae (Fig. 31): 8 promarginal teeth and 7 retro-marginal teeth, basomesal teeth absent; rastellum conspicuous on distinct process, 17 spines on dorso-porolateral, vertical face and up.

Sternum (Fig. 30): yellowish-brown, with elevated anterior and lateral sides, sloping posteriorly, 3.74 long, 2.88 wide,

covered with long black hair, row of these radiating out of borders, posterior angle acute.

Sigilla (Fig. 30): anterior, diameter 0.14 and 1.32 apart, marginal; middle, diameter ca. 0.22 and 1.86 apart, distance from margin 0.12; posterior sigilla absent.

Legs: Leg IV clearly thicker than rest, yellowish-brown above and light yellowish below, except tarsi of palp and metatarsi and tarsi of all legs darker above. Femora III clearly wider than rest. Metatarsi of all legs longer than tarsi. Two conspicuous hairless bands running for length of femora, patellae and tibiae. Scopulae and claw tufts absent on tarsi of all legs and palp. Leg formula 4132.

Spines: curved thick thorn-like or stout spike-like spines. ti I, p = 11, r = 11; mt I, p = 15, r = 19; pa = 4, ta I, p = 5, r = 6, v = 6; ti II, p = 6, r = 4; mt II, p = 14, r = 6, v = 1; ta II, p = 5, r = 3, v = 2; pa III, p = 8, r = 3; ti III, p = 6, r = 7; mt III, p = 10, r = 10; ta III, v = 10; pa IV, p = 14; fe IV, p = 2; mt IV, p = 4, v = 3; ta IV, p = 5, v = 7; palp, fe, p = 2, pa, p = 1; ti, p = 15, r = 10; ta, p = 18, r = 20, v = 6.

Coxae: yellowish-brown ventrally, IV wider than rest, I longer than rest.

Claws: all legs with three claws, paired claw with single tooth. Palp with single claw bearing single unequal tooth. Claws of leg IV longer than rest, and of leg I & II equal, claw of leg III smallest. Claw tufts absent.

Abdomen (Fig. 28): glossy blackish brown with silvery golden spike-like hairs in life; in alcohol, greyish-brown dorsally; covered with short and long hairs; ventrally yellowish covered with black hairs.

Spinnerets (Fig. 33): PMS digitiform; PLS, apical segment dome-shape. Covered with brown hair and spigots.

Spermathecae (Fig. 34): a pair of spermathecae, emerging from distal ends of each leaf-like sclerotized structure fused at base. Stalk on leaf-like structure supports stalk resembling an inverted bell.

Natural history.—The type specimens were collected near a small hamlet on the periphery of Aarey Milk Colony from degraded and barren flat land (Fig. 35). The surrounding area is dominated by *Butea monosperma*, which has been cleared at the collection site for agricultural purposes. All three specimens were collected within an area of less than 10 m². The burrows were mostly found near the base of dead *B. monosperma* or near large boulders. They were vertical, with a slant of 20–30° to the surface. The burrows were lined with a thick layer of silk, as seen in other species of the family Idiopidae and Ctenizidae (Z.A. Mirza & R.V. Sanap personal observation). The burrows in this particular area were constructed in a patch where the soil was dry and very difficult to dig, as compared to the loose and clay-rich soil preferred by *I. bombayensis*. All the burrows of the new species were vertical in orientation, but otherwise were constructed similarly to those of *I. bombayensis*. In less than 1 m², a total of six to eight large burrows were found, indicating high density. The collection site receives direct sunlight throughout the day during summer, but is covered with dense undergrowth throughout the monsoons up to late winter. The diameter of the entrance of the burrow of the male holotype was 12.5 mm and that of the female paratype was 14 mm; door thickness in the center of the male's burrow was 3.2 mm and that of the female was 2.7 mm; the door diameters of the male

and female burrows were 16.8 mm and 19.9 mm, respectively. An unhatched egg sac of this species was found at the base of the burrow where the types were collected on 4 July 2010, but a female was not present in the burrow. Careful searching revealed another burrow in the vicinity (ca. 100 mm away), which was occupied by a large female. This species is under threat, at least at the type locality, as it is only known from a small patch at the locality. The area in this region is degraded and used by locals for agricultural purpose and bootlegging, for which the forest is cleared, which adversely loosens the soil. The loose soil is washed away by the overflowing Vihar Lake and the seasonal forest streams, which leads to heavy destruction of the habitat of this and several other species. This species has also been seen in Sanjay Gandhi National Park (Fig. 40).

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